Georgia Department of Public Health

Game Planning for Infectious Diseases

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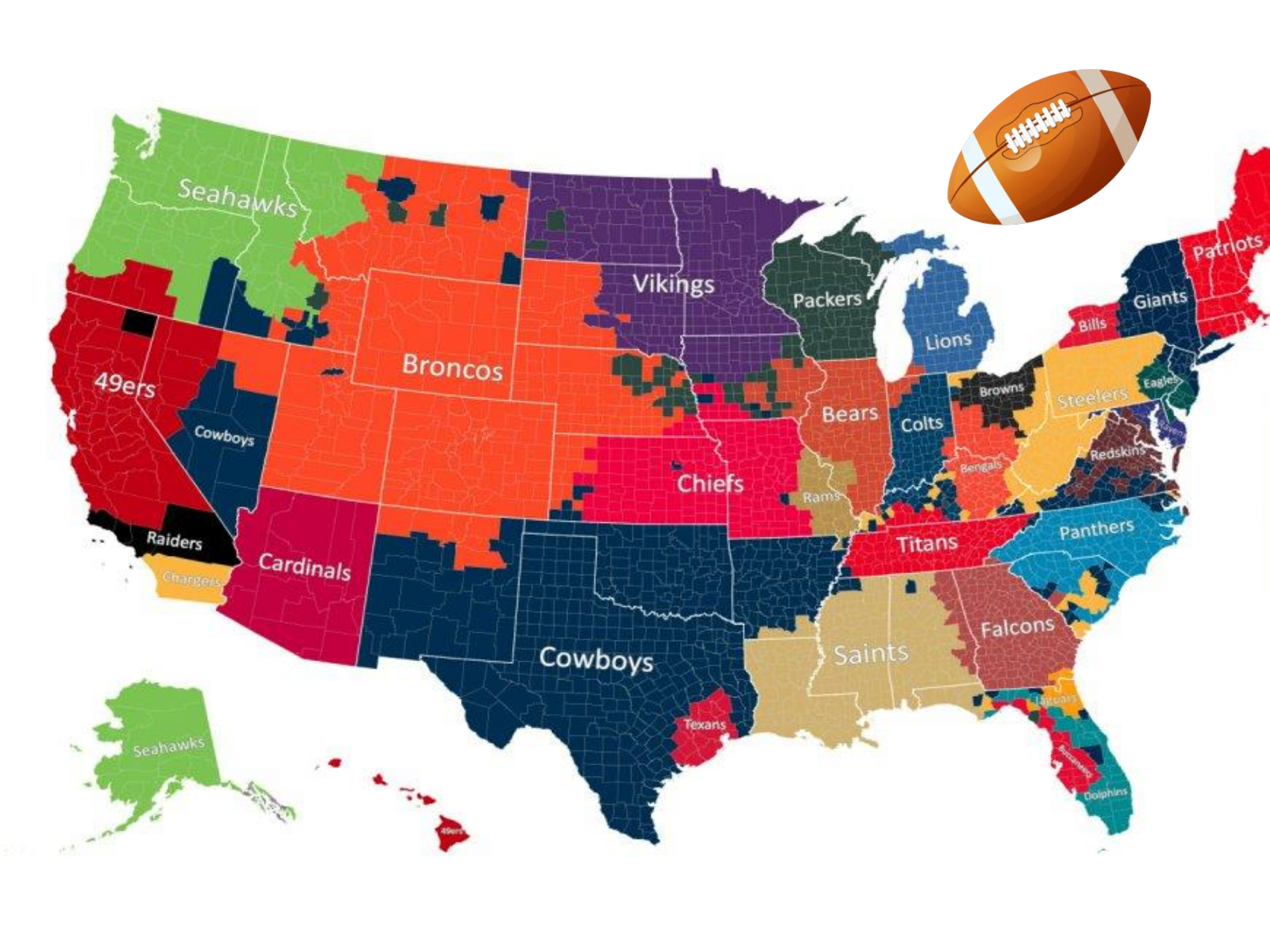
State Epidemiologist
Date: 11/12/2014

We Protect Lives.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Redskins
Bengals
Chiefs
Rams
Raiders
Chargers
Cardinals
Titans
Panthers
Cowboys
Saints
Falcons
Texans
Seahawks
Dolphins
49ers

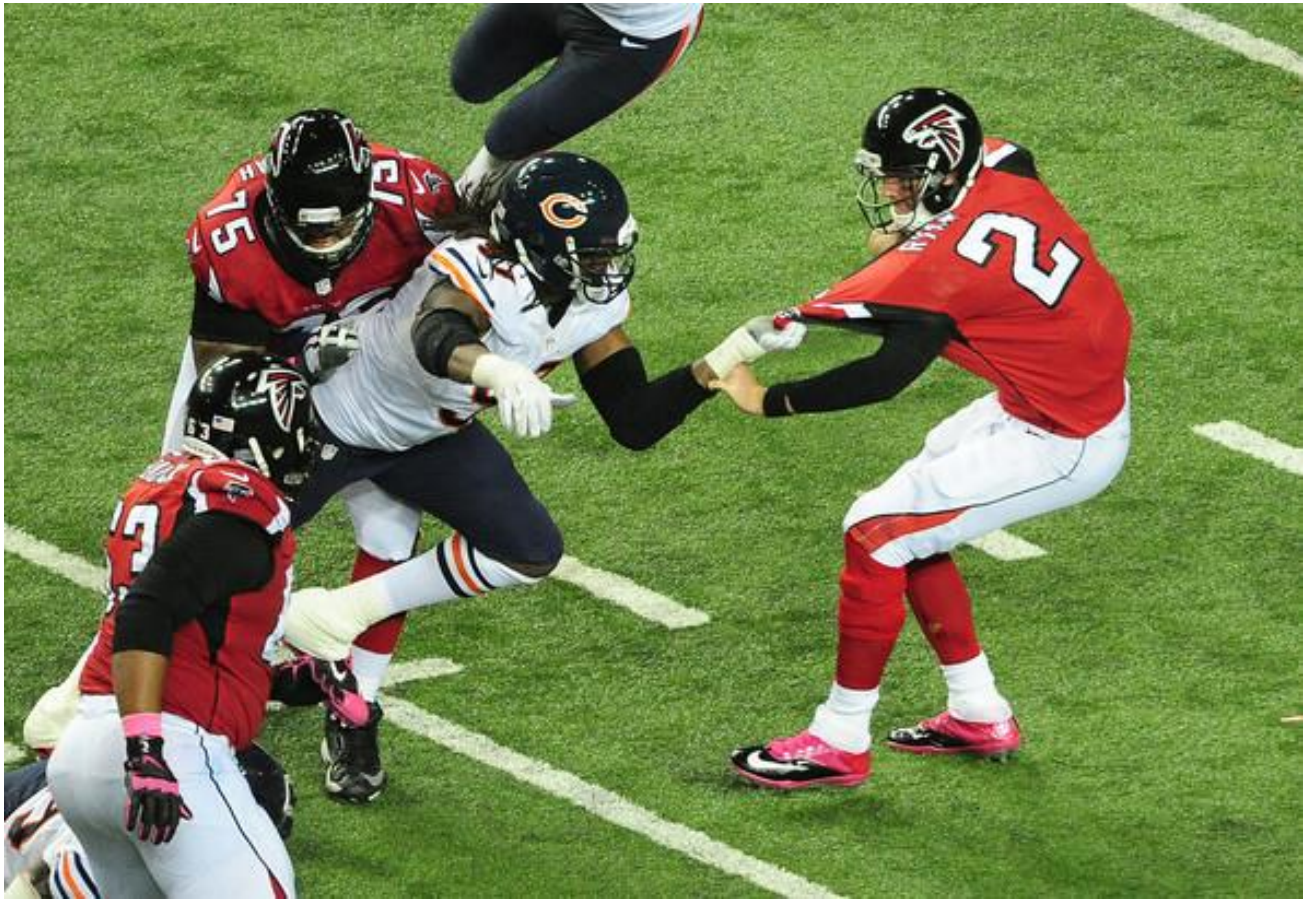
NFL Game Planning

- Scouting Reports
- Stats
- Film Study
- Opponents' Tendencies
- Neutralize Strengths
- Exploit Weaknesses

GOAL: WIN!

NFL Game Planning

NFL Game Planning

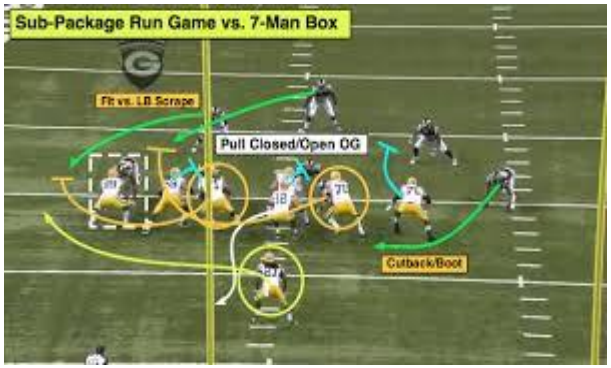


Infectious Disease Game Planning

GOAL:

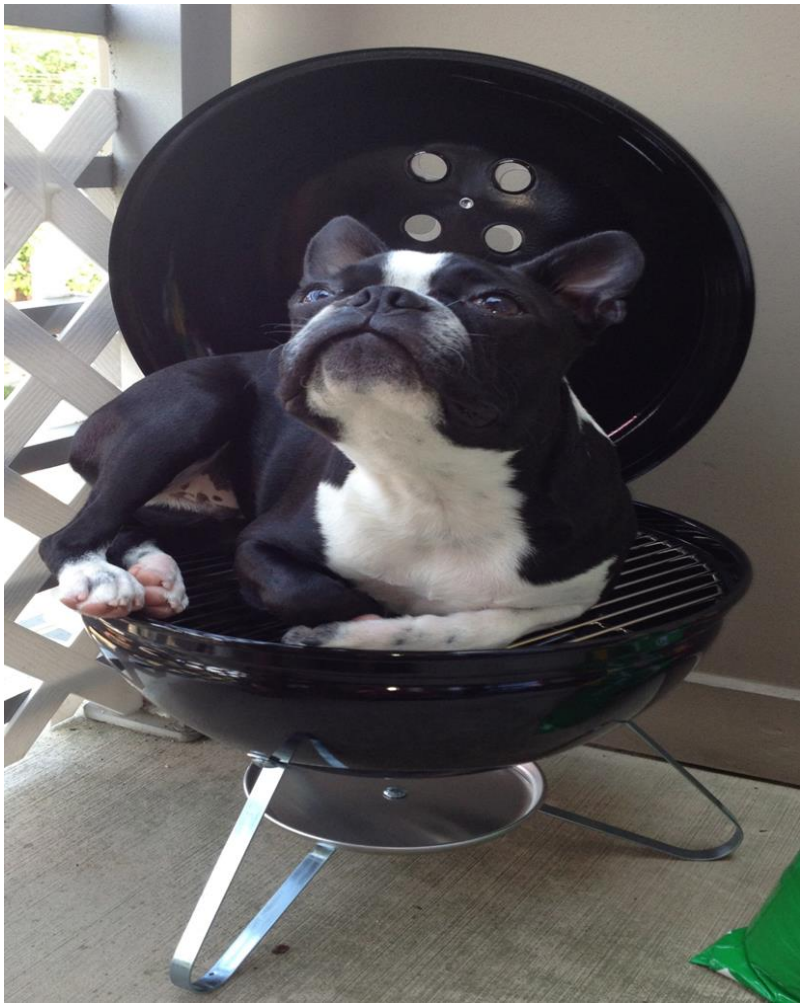
How? PPE, handwashing, vaccines, antibiotic treatment, disinfection, decontamination, food recall, restaurant closure, and others…

Infectious Disease Game Planning: How do we know how to stop transmission?



- Know your Opponent
  - Know the Chain of Infection
  - Understand the Natural History of a Disease
  - Understand the Epidemiology of a Disease
- Exploit Weaknesses

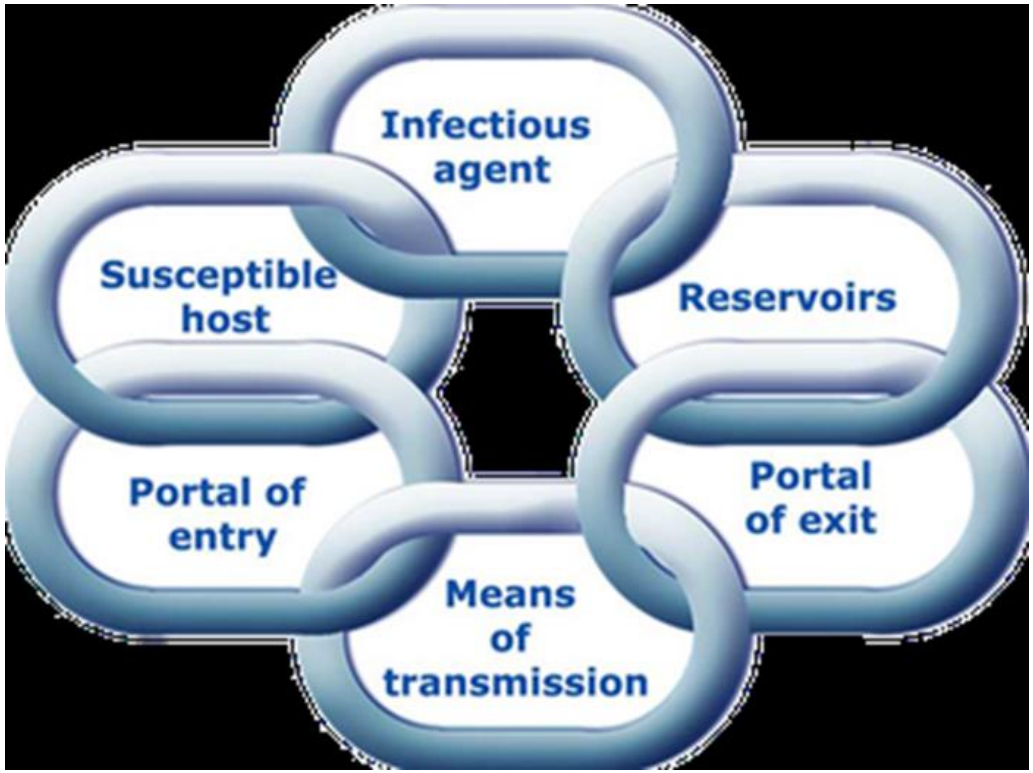
Game Planning
First Step: Tailgating



Infectious Disease Game Planning
Know Your Opponent: Microbes

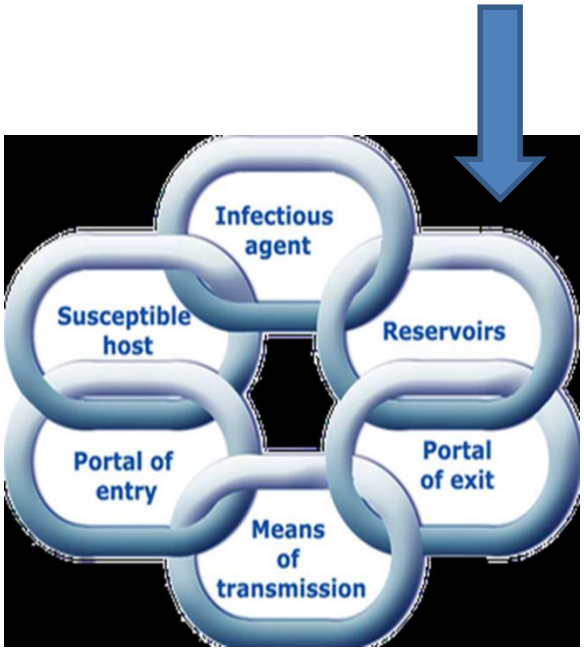
- **What is a Microbe?**
  - Our unseen friends and foes
  - Friends produce wine, foes cause human (or animal) infection and illness
  - They are everywhere!
  - Types:
    - Bacteria (*Salmonella*, TB, *E.coli*, MRSA)
    - Viruses (Ebola, norovirus)
    - Yeast and Fungi (*Candida*, *Exserohilum*)
    - Protozoa (*Cyclospora*, *Cryptosporidium*)

Infectious Disease Game Planning
Know the Chain of Infection



Opponents: Infectious Agents

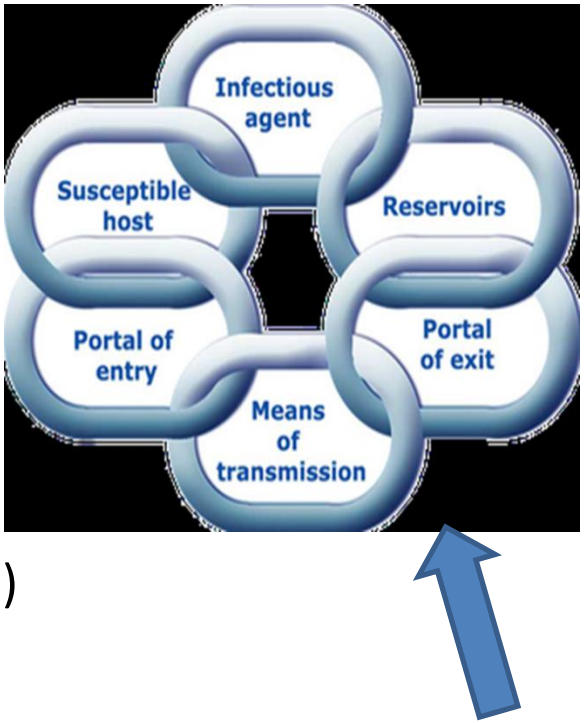
- Found in nature in reservoirs (its natural habitat)
- Reservoirs can be people (pertussis, norovirus), animals (Ebola, *Salmonella*, *E.coli* O157:H7), or inanimate matter like soil (botulism, tetanus, anthrax)
- Microbes survive and reproduce in the reservoir. Sometimes the microbe makes the reservoir sick, sometimes not.



Chain of Infection: How do microbes exit the reservoir and infect someone else?

Modes of Transmission

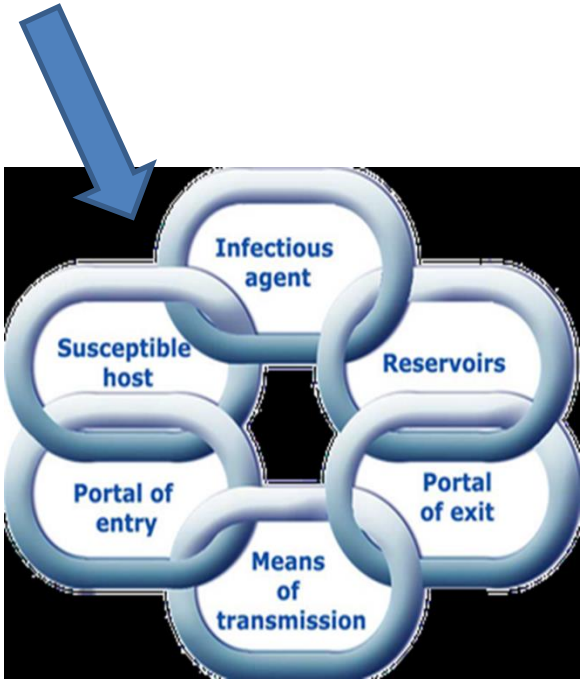
- Many ways! Many definitions! Many levels!
- Direct vs Indirect
- Vehicles (Food, Fomites)
- Vector (Mosquito, Tick)
- Person-to-Person
- Airborne (Measles, TB), Bloodborne (HIV, Hepatitis B) Fluid-borne (Ebola), Foodborne (Salmonella), Waterborne (Cryptospordium)
- Zoonotic (Ebola, MERS, Rabies, Q fever)




HI, YOU MAY REMEMBER ME
FROM THE ALPHABET

Chain of Infection: How long does it take?

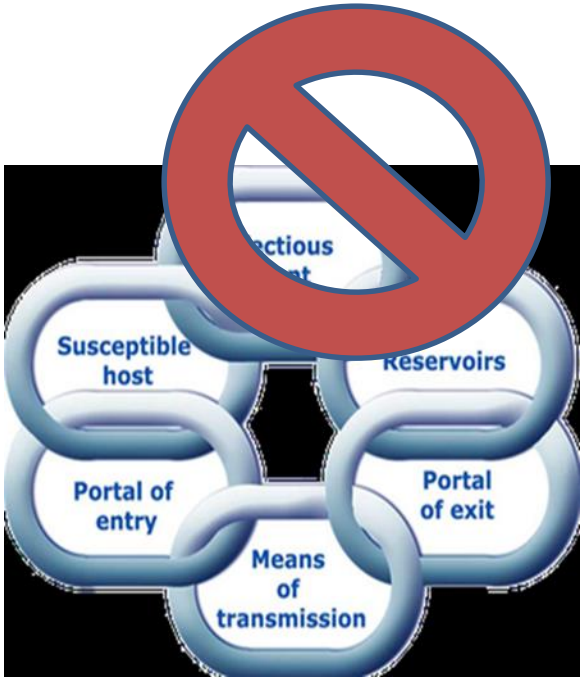
- Incubation period
  - Time from exposure to the microbe to the development of symptoms
- Examples: Flu 1-4 days, Ebola 2-21 days, TB 3-12 weeks, rabies 2 months-1 year
- Contagious or Shedding Period may precede symptoms
- Knowing both **key** to risk assessment and control



Patterns
(Or, the Epidemiology of our Opponents)

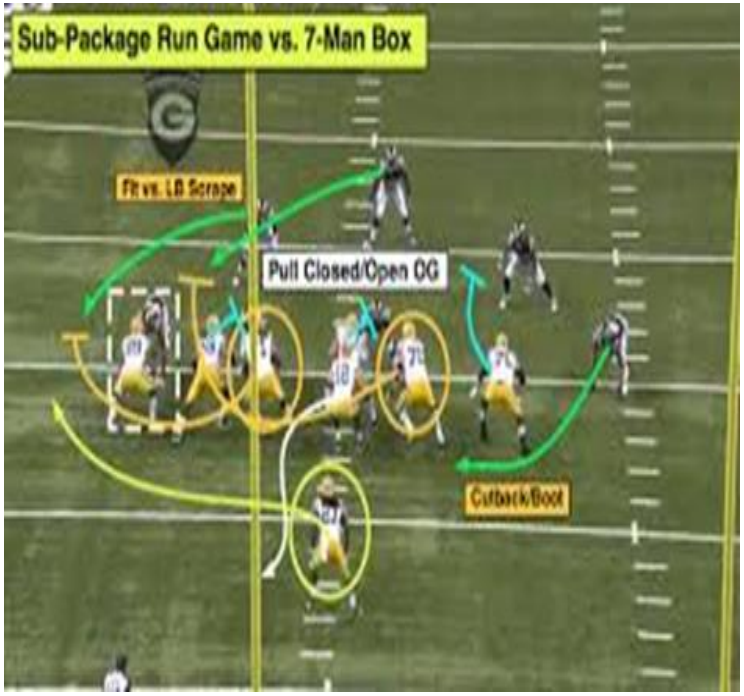
- It's a Small World After All: Emerging infectious diseases are only a plane, boat, ship, or bus ride away
- In 2014, the world shared these infectious diseases: Influenza A H7N9, Chikungunya, MERS, and Ebola
- For foodborne outbreaks: widely distributed contaminated food products; many fresh produce vehicles
- Prevalence of antimicrobial resistance (MRSA, MDR-TB, CRE) and healthcare-associated infections

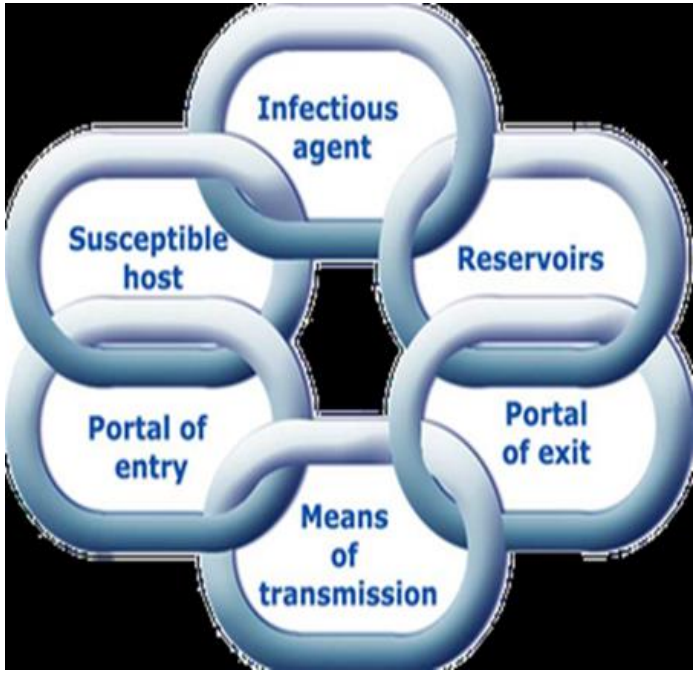
How Does This Help Us Break the Chain?



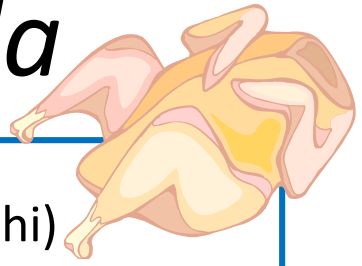
- Control at any link in the chain
- Some easier
- Reservoir harder
- ★Transmission/entry = PPE, disinfection, handwashing
- ★ Susceptible host = vaccination, isolation, quarantine
- Also focus on epidemiology: early detection among travelers

Some Examples of ID Game Plans

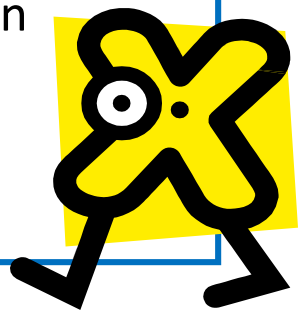




Bacterial Agents: *Salmonella*

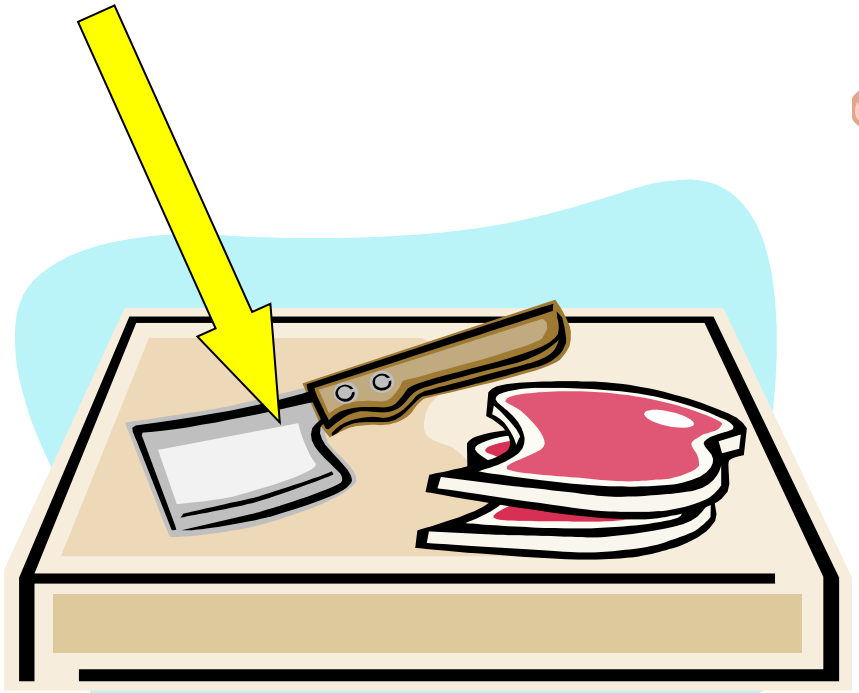


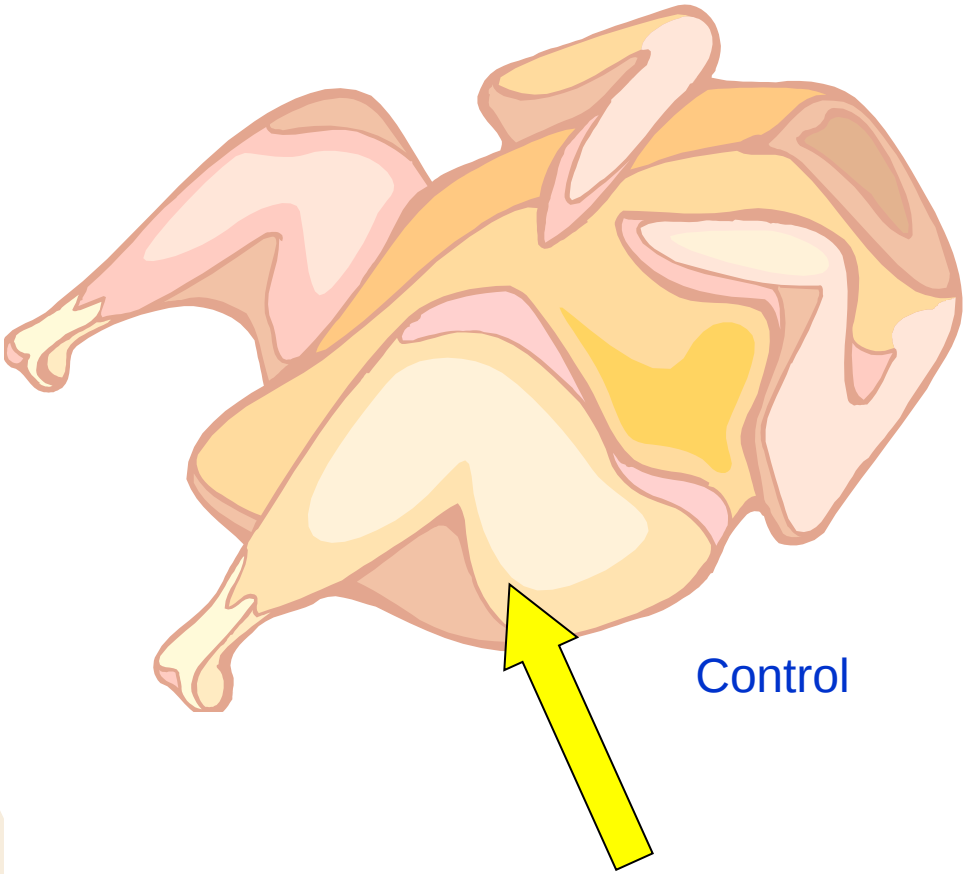
- **Reservoir:** Animals (poultry, cattle, amphibians), Humans (typhi) SEROTYPE-specific
- **Incubation period**: 1-3 days
- **Clinical symptoms**: diarrhea, fever, abdominal cramps, SEVERE, death
- **Epidemiology/patterns:**
  - Restaurants, environment, PFGE clusters
- **Associated vehicles:**
  - Eggs, chicken, fresh produce (melon, tomatoes, sprouts)
- **Spread:** Cross-Contamination from Food to Environment to Person



Bacterial Agents: Salmonella

Control





Control

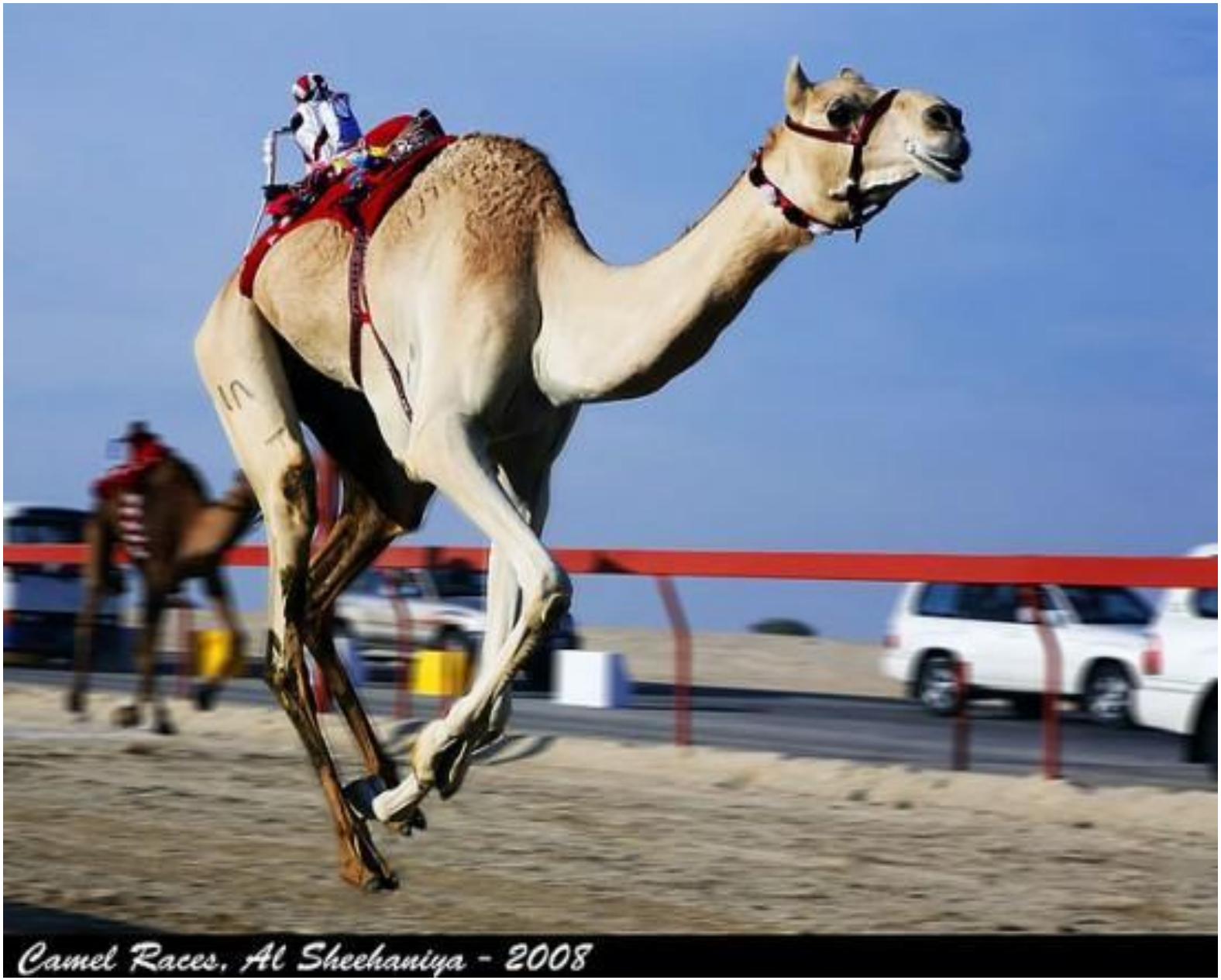
Viral Agents: MERS Coronavirus

- **Reservoir**: Camels?
- **Incubation period**: 2-14 days
- **Clinical symptoms**: Severe acute respiratory illness, fever, cough, death.
- **Epidemiology/patterns**:
  - Travelers to Middle East (21 countries), healthcare spread, some close contact spread
- **Spread**: Direct contact, droplet?
- **Control:** WHO says people with diabetes, kidney failure, or chronic lung disease and weakened immune systems should:

  Avoid contact with camels

  Do not drink raw camel milk or raw camel urine

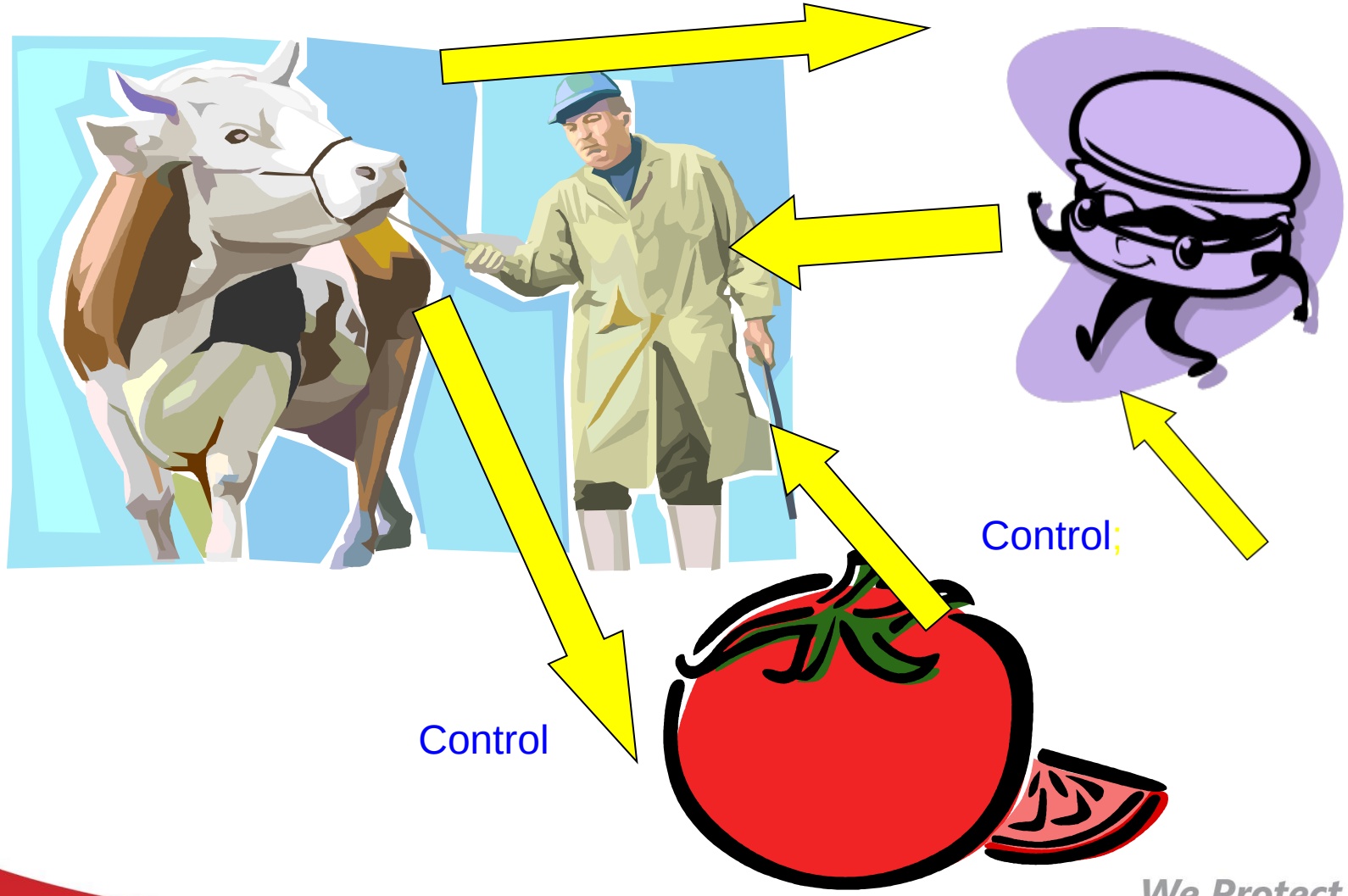
  Do not eat undercooked camel meat


Camel Races, Al Sheehaniya - 2008

Bacterial Agents: *E.coli* O157:H7

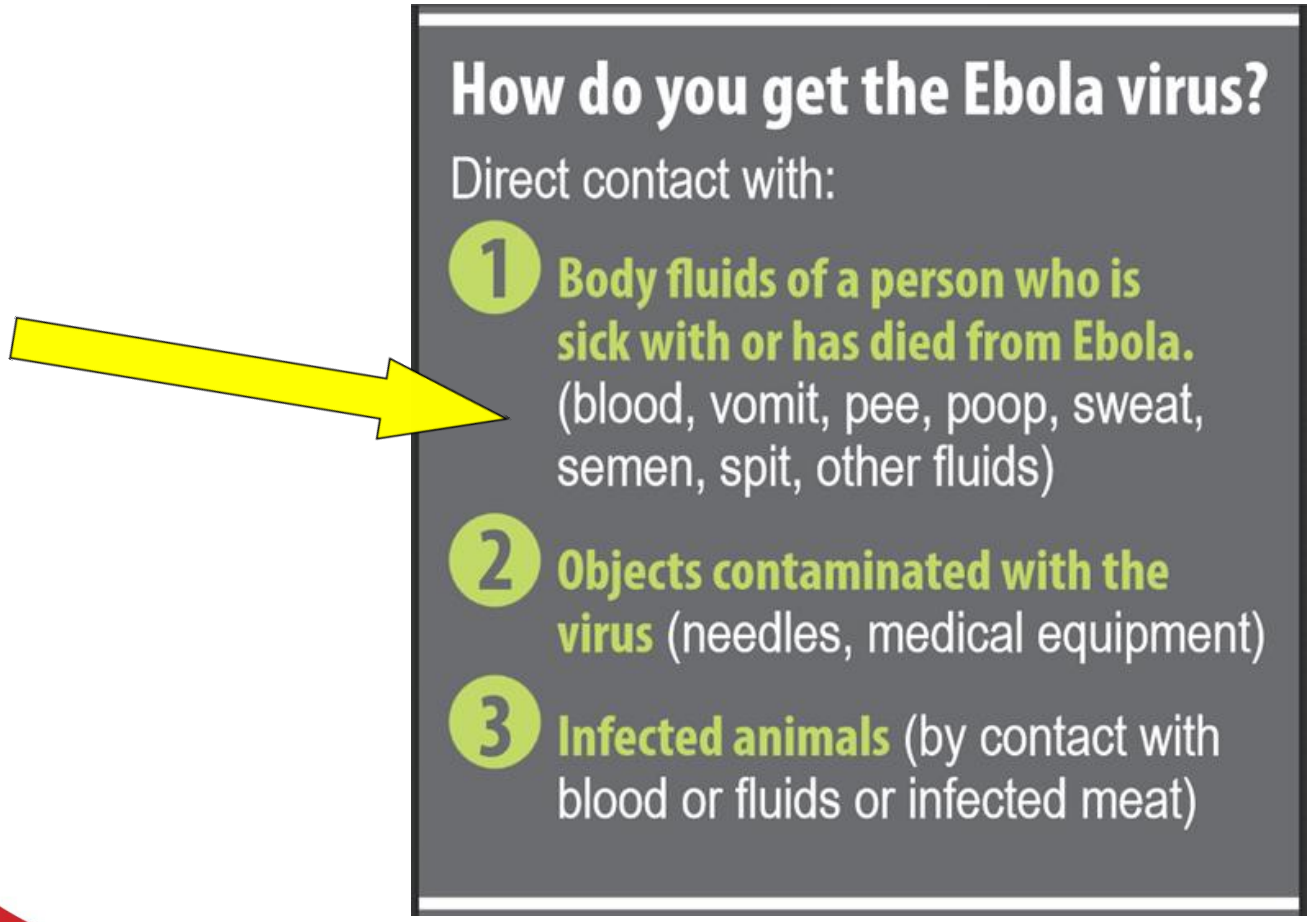
- **Reservoir**: Cattle
- **Incubation period**: 1-8 days
- **Clinical symptoms**: Severe/bloody diarrhea, abdominal pain, vomiting, HUS, death.
- **Epidemiology/patterns**:
  - Restaurants, events, fairs, water/recreational water
- **Associated vehicles**:
  - Undercooked ground beef, fresh produce (apples, sprouts), water
- **Spread**: Cattle feces to beef or to produce via water or manure

Bacterial Agents: *E. coli* O157:H7
Where's The Beef?



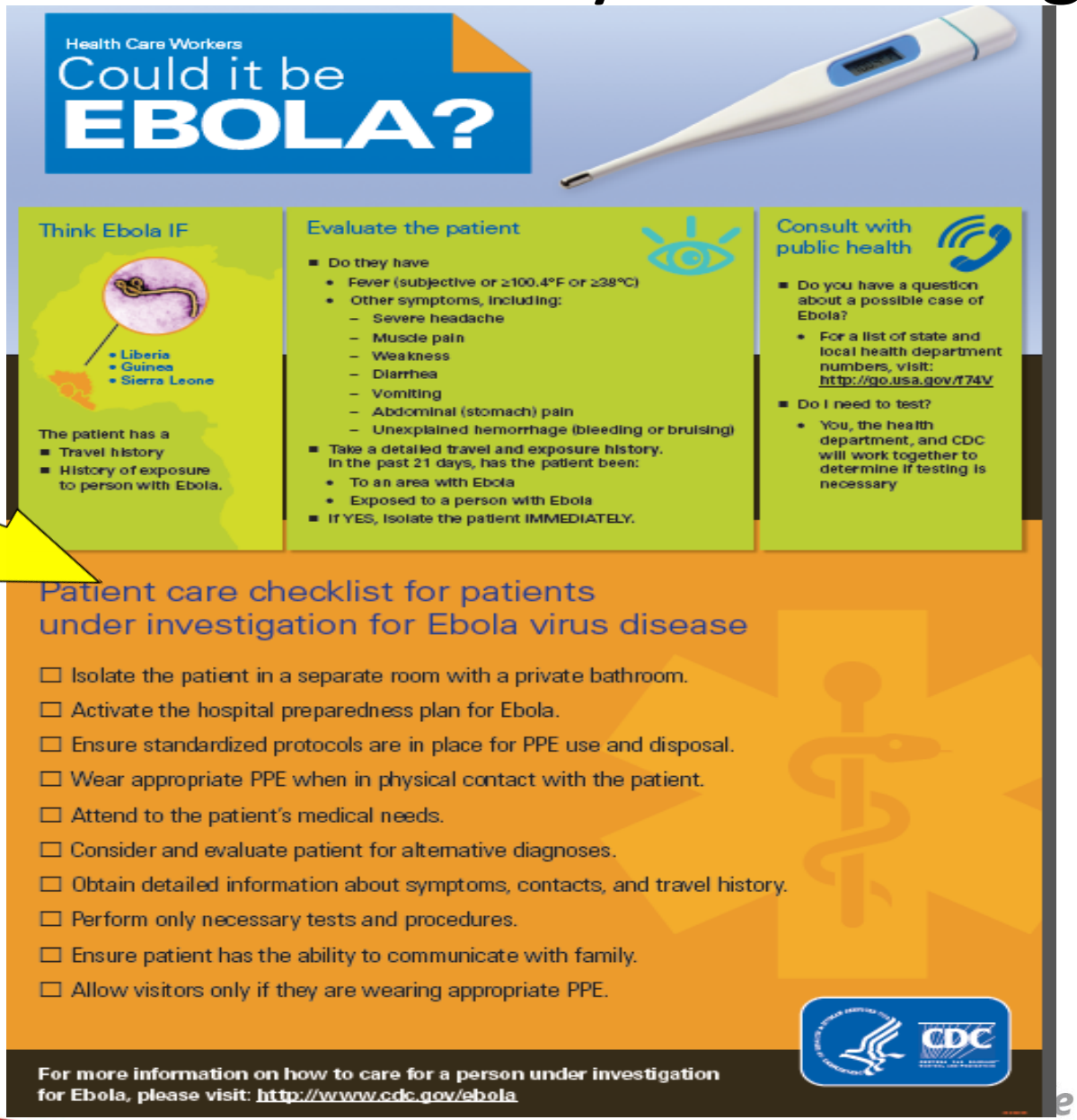
EVD Natural History: Transmission

- Ebola is spread through **direct contact**



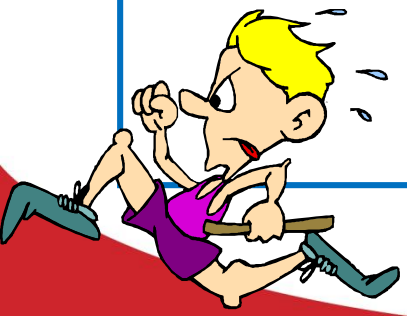
Is NOT Airborne

Epi Patterns: Ebola Early Case Recognition



Toxin Producers: Staphylococcus aureus/MRSA

- **Reservoir**: Humans (nose, throat, boils, piercings); Animals
- **Incubation period**: Varies
- **Clinical symptoms**: Skin infection, boils, purulent, “spider bite”
- **Epi patterns**:
  - Athletic Teams (Tampa Bay Buccaneers), healthcare settings
- **Associated vehicles**: towels, razors, shared equipment, whirlpool
- **Spread**: skin-to-skin direct contact, indirect via vehicles above
- **Control**: Keep wounds covered, handwashing, no sharing



Parting Words

- We rarely mentioned “You Know Who”--“Eboldemort” –don’t worry--more to come!
- Etiologic natural history is the foundation of our game plan to defeat our opponent microbes and the keys to their control.
- Infectious disease preparedness has multi-purpose benefits; partnerships always the key to overall improved community health.
- And if something just doesn’t seem right…

How to Contact Epidemiology (24/7)

- Office/Epi On Call (8-5): 404-657-2588
- State Epidemiologist: Cherie L. Drenzek, DVM, MS
  Office (direct line) 404-657-2609
  Cherie.Drenzek@dph.ga.gov

- 1-866-PUB-HLTH

When it Comes to our Microbial Opponents…